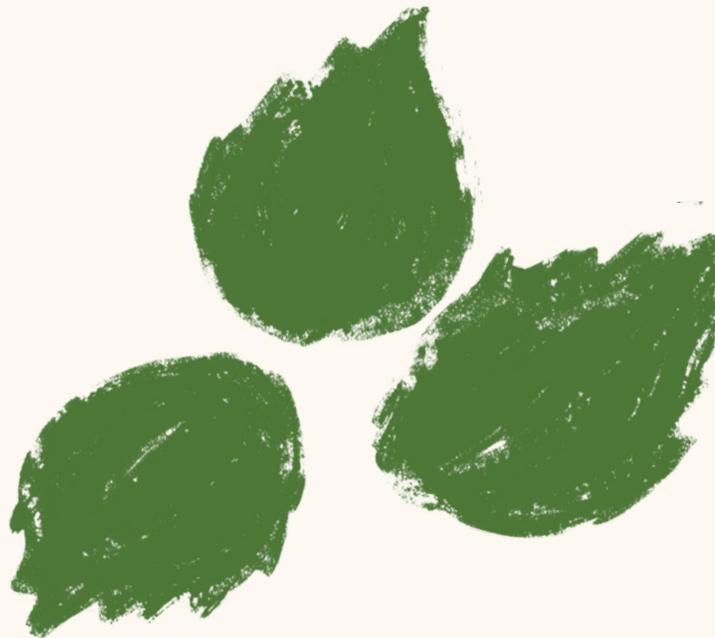
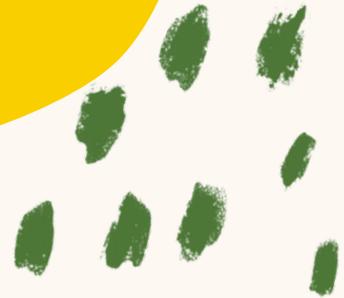




PERILLA

Grower's Guide





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ABOUT US

Second Generation Seeds is a collective of Asian American growers devoted to helping communities of the Asian diaspora discover and deepen their cultural heritage through seeds. Together, we are reclaiming the narrative around Asian crops and our foodways.

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CULTURAL CONTEXT & HISTORY



As I was showing a friend around my farm, we arrived inside my very fragrant greenhouse. Tarps were drawn over the hoops, making the area used for seedling production in spring, a veritable cave, perfect for drying various crops down to mature their seed. Stepping into the area where my seed crops were laid out, she seemed to recognize the smell of the plants, but couldn't quite determine who they were. When she asked, I told her that she was surrounded by perilla. "What's that?" she asked, somewhat surprised that my answer was unfamiliar to her. "Kkaennip", I responded. At this point, the familiarity caused her to exclaim, and she clarified, "is perilla another name for kkaennip?" I responded affirmatively, and she laughed a little at her realization that this plant could be known by another name.

In the book, *A Wizard of Earthsea*, Ursula Leguin writes, "When you know the fourfoil in all its seasons, root, leaf and flower, by sight and scent and seed, then you may learn its true name, knowing its being: which is more than its use." Many people know and love perilla, and they know them by many different names. But while western taxonomy classifies perilla as a single species genus (*Perilla frutescens*), for communities who are devoted to their kkaennip, or tía tō, or pak maengda, or shiso, each variety is completely distinct. So, more than a mere matter of semantics, each of the names this plant is known by will distinguish the cultivar. It's a testament to the love between various peoples and perilla cultivars that each variety is imbued with a sense of being unique in all the world.

As a Korean-American, kkaennip truly feels like kin. Patches of kkaennip act as a lighthouse of sorts, generally signaling the presence of other Koreans, and regardless of how small a space one may have to grow anything, a sizable portion of that space is usually devoted to these plants. When I've brought leaves to various community functions, they are always met with squeals of delight, and when folks have encountered the plants growing on the farm, there's always a sweet moment of recognition and appreciation. In our Seed Stewards program, families conduct community interviews to learn about the traditions and cultural contexts for different crops. In many of the interviews where ajummas and halmonis were interviewed about kkaennip, when asked to describe the flavor, they merely responded that it tasted "very Korean". I once asked someone why they thought Koreans loved kkaennip so much and she slapped me and said, "What are you talking about? We were born to love kkaennip of course. We've always grown together. Stop asking strange questions."

There are in fact seven recognized chemotypes within the genus *perilla*, classified based on the chemical composition of their essential oils. *Perilla*, whose origins are in China and the Indian highlands, became morphologically distinct in relationship to the various lands and peoples they encountered. Since people have enjoyed all parts of the plant, preferences in taste, odor, and appearance repeatedly guided the selection process, yielding different characteristics based on the distribution of key essential oils. Primarily, the domesticated cultivars used for food and medicine throughout Asia are PA types (whose main compound is perillaldehyde), and PK types (whose main compound is perilla ketone). Most of the varieties used for medicinal purposes are PA types and are classified by variety: *Perilla frutescens* var. *crispa*, *acuta*, and *viridis*. *Perilla frutescens* var. *frutescens* is a PK type, and is used as both fresh herb and oilseed crop.



Below is a breakdown of some perilla varieties with their expanded binomial:



Kkaennip (leaf) 깻잎 (Korean)
Deulkkae (seed) 들깨 (Korean)
Egoma えごま (Japanese)
Baisu (Chinese)
Thoiding (Manipuri)
Kenie (Naga)
Perilla frutescens var. *frutescens*



Cha Jogi 차조기 (Korean)
Cha Soyeop 차소엽 (Korean)
Aka shiso 赤紫蘇 (Japanese)
Zisu 紫蘇 (Chinese)
Perilla frutescens var. *acuta*



Lá tía tô (Vietnamese)
Chungsoyeop 충소엽 (Korean)
Katamen Shiso 片面紫蘇 (Japanese)
Perilla frutescens var. *crispa* f. *viridis*



Aka Chirimen Shiso 縮緬紫蘇 (Japanese)

Jureum Soyeop 주름소엽 (Korean)

Perilla frutescens var. *crispa*



Ao Shiso 青紫蘇 (Japanese)

Oba 大葉 (Japanese)

Perilla frutescens var. *crispa* f. *viridis*



I should note here, that in northern Thailand and Laos, the mericarps are traditionally roasted and eaten with sticky rice. The perilla strains cultivated in these regions for the seed seem to be domesticated forms of *Perilla setoyensis*, an SF type (whose main compound is shisofuran). And while the leaves are eaten in Laos, where people know them as pak maengda(ພັກແມງດາ), I am uncertain as to whether that refers to single or multiple strains of red leaved *P. frutescens* var. *acuta* or *crispa*.

In the North Eastern Hill (NEH) regions of Manipur, Meghalaya and Nagaland, there are numerous locally adapted landraces, predominantly var. *frutescens*. However, in places where the primary selection pressure has been for seeds rather than leaf edibility, the essential oils are quite different. We grew two cultigens from the NEH region, and while they look very similar to our kkaennip variety, plants evolved to be a lot fuzzier, and the characteristic aroma of the type I'm most familiar with was not present. So even within similar subspecies, where plants' physical characteristics bear a strong resemblance to one another, other critical factors render varieties still very distinct.

Now that we've gone into some detail to clarify some of the interesting distinctions between perilla cultivars, let's look at how to care for them. While different varieties have different levels of seed dormancy, and different timelines for flowering, we can still talk broadly about perilla in how we approach growing them.

BOTANICAL OVERVIEW

Perilla is an obligatory short day plant, meaning it grows vegetatively during the months where days are long, then, when the days shorten and the nights are getting longer, it readies itself to flower and then develop seed. This is generally called the plant's "critical photoperiod", which marks the balance of day and night time hours needed to induce flowering. So while some plants initiate flowering at a certain point of maturity, or in response to stress (bolting), perilla's biology is inextricably tied to its sense of the passing of time, and presence of light. And unlike other plants who will continue to grow vegetatively simultaneously with flowering and fruiting, once perilla starts to flower, it ceases to make new leaves. This is important to consider when you are saving seeds. You want to plant early so they can grow as much as possible before flowering. The more vegetative growth it forms, the more surface area to photosynthesize, which means it can make vigorous seeds. It also means that you don't necessarily need to plant multiple successions, since perilla will reliably make new leaves throughout the season.



It also means that what latitude you're on can affect successful seed saving. In northern latitudes (above the 40th parallel or so), it can be a little dicey as to whether you'll have enough days once flowering starts to mature seed before cold nights begin to hamper the plants. Our farm is at 38 degrees north, we plant perilla in March in our greenhouse, set plants in the field in late April/May, and they begin to flower at around the end of August/September. Seed development takes about a month and a half. We bring our seed plants in from the field in late October and then process the seed in November. So in places where your first frost date happens as early as October, it may be more challenging to harvest lots of mature seed. In latitudes that are more day neutral, the critical photoperiod may not be met, and plants may behave as perennials, or only flower every few years.

GROWER'S GUIDE

GETTING STARTED

March through May are good times to plant perilla. They are fairly frost-sensitive, so plan around your last frost date. You want to germinate them in early spring as the days lengthen and light begins to intensify. They should be well established by the summer solstice, hopefully having about 4 leaf sets. By your peak season, they should have nice, full canopies.



Here's kkaennip as they first emerge

Prepare a nice seed bed. Perilla needs light to germinate, so don't cover or plant them deeply. Broadcast the seed on the surface. Gently tamp it in with your hand or a rake. You don't want to bury the seed too deep, but you want it to be nestled in the soil, so there's enough contact to germinate. Variety *frutescens* have larger, softer seeds than varieties *crispa* or *acuta*. Smaller seeded varieties can display seed hardness, which may make them germinate more asynchronously, or take longer.

Their dormancy can vary, so some people will do a cold treatment to break dormancy. In general, planting a little later often resolves the issue of dormancy. Soaking seeds will also help seeds imbibe enough moisture to enhance even germination. We lay seeds out on a damp towel that we mist throughout the day ensuring consistent, but not excessive moisture. When we notice the seed coat beginning to split, but before the radicle emerges, we move the seeds to a soil medium. Birds really love the seeds so take this into account! And slugs like the cotyledons. The keys to high germination are light and consistent even moisture.

GROWER'S GUIDE

SEEDLING STAGE

If starting indoors, seed in either 50-cell or 128-cell plug trays or in 1020 flats. Once they come up and have a true leaf, they can grow rapidly. For us, 50-cell sized trays work best to give seedlings enough room for the month that they'll be indoors without getting root bound.

And here they are expanding their first leaves. If you broadcasted seed into a large flat, now would be the time to move them up into larger pots. Their roots are vigorous, and to minimize the impact of disturbing them, it's best to separate seedlings and give them more room once they have their first true leaf. If using 128 cell trays, you have about two weeks or so after they emerge, when planted directly into a 50 cell tray or larger, then you have about 3-4 weeks from the time they emerge to get them into their more permanent location.



GROWER'S GUIDE

PLANTING



Here they are transplanted into our field in early May. At this point, the plants are quite self-reliant. Its fertility requirements are not too intense. We don't even generally amend with compost, so long as your soil has sufficient organic matter content. We mulch in order to retain moisture. Water is essential. While not too fussy, inadequate moisture will cause some suffering. It's ok if the leaves droop a little at the height of the day, they're just trying to avoid transpiring water. But make sure that at the end of the day, the leaves are perked up again. If you notice sagging leaves that are starting to look wrinkly, it's definitely time to water. When they're still young, if leaf margins start to brown or dry up, the plant may be experiencing moisture stress. If the leaves droop and become chlorotic, it may be a sign of water logging, and you should let the soil dry out a little. Once they are established, their threshold for too little or too much water is a little bit more developed. But when they are young, and newly transplanted in the field, they can be vulnerable.

GROWER'S GUIDE

HARVESTING

You can either trim individual leaves from the bottom up, or trim at a node to encourage branching. A node is the point on the stem above each leaf set. In the photo below, the node is marked by a red dot. You will notice a tiny pair of leaves growing in the elbow between the stem and leaf. This is known as an axial bud. If you trim right above there, the plant will redirect energy to grow from those elbows, growing now two stems. The axial buds will take over as the primary growth point. We prefer to keep their primary growth point in tact, harvesting individual leaves.



Either way, approach harvesting as an act of pruning, considering the overall architecture of the plant, and how to ensure good light and air circulation. This will yield good quality leaves, seeds, and prevent risk of pathogens. They don't generally suffer even when they are crowded, though it mostly causes the plant to lengthen between nodes in order to access sunlight. If the plants are given more space, they will be bushier and a little heartier. We recommend at least 12" spacing on any side between plants for optimum growth.

For the plants you intend to save seeds from, you should give them at least 2 feet on any side. And remember, be sure to leave enough leaves so that the plant can continue to photosynthesize and make food for its own sustained growth.

GROWER'S GUIDE

SELECTING SEED MOTHERS

So now you are enjoying your fresh kkaennip leaves and the beautiful golden glow the plants contribute to your garden. Around August, the plants will be preparing to flower in order to make seeds. At this time, if you haven't designated which plants are your seed mothers, you may want to reserve a few plants that you allow to grow big and stop trimming from. Let these plants develop as much biomass as possible so that all the energy accumulated by photosynthesis can be transferred to the seed. Remember, once their flower racemes form, they stop producing new leaves. So if we continue to take the leaves, the result will be less ability for the plant to make food for themselves.

The key thing to think about now is which of your plants look most vigorous and display the growth habit you wish to preserve in the following generation. Does one plant strike you as particularly beautiful? Does one plant have larger leaves? Does one's color stand out in a particular fashion? Has one shown more resilience to various stressors than the others? Is one outrageously fragrant?

While perilla is self-fertile, they can cross with other varieties (with a higher likelihood of crossing between members of the same subspecies). Keep this in mind if you want to maintain individual varieties consistently. Make sure they are reasonably isolated to ensure minimal crossing if that's not what you're looking to do. There's not too much risk of seeing problems of inbreeding depression should you not have a large enough population of plants you save seed from. But it's always best to have at least a few plants you save from to keep some genetic variability present.

GROWER'S GUIDE

SEED DEVELOPMENT



One day you will notice something different happening at the apex of each plant. Instead of a baby pair of leaves forming, you will find the beginning of a flower raceme. It looks like this.



What looks like a series of intricately folded papers will gradually extend and lengthen into a raceme of small white, pink or purple flowers:

GROWER'S GUIDE

HARVESTING SEED

Each flower produces four seeds. When pollination occurs, the petals fall off, and the seed matures. If you look at the pictures above you can see the progression, as the raceme extends, the calyces mature from bottom to top. As the seed reaches maturity, the calyx will swell. They look like little bells, and when the mouth expands, the seed has generally reached maturity. The seeds do not ripen at the same time, so you want to harvest when the majority of seeds have fully grown.



Generally, we aim to harvest the plant once about 85 percent of the seeds look full and plump. Try to leave them in the field as long as you can, but when you can clearly see the four seeds resting in the ovule, even if the seed coat is not developed, it is safe to cut the plants at the very base, and finish maturing indoors.

GROWER'S GUIDE

DRYING AND THRESHING



You can hang them in burlap sacks or woven bags, or just lie them down "banquet style" as seen below. It's best if the plants can dry, and the seed coat can develop slowly, so we keep them in a shaded area. We lay them on row cover, but any light breathable fabric will work and will catch any seeds that drop while the plant is drying. Make sure there is decent air circulation as well. Once the plants are fully dry, and the seed has all that it needs you can give the plant a shake and hear a rattling sound. This will signal that you're ready to thresh!

Bring the dried plant to a tarp or other large material to catch the seeds. Use a stick to hit the plant, or shake them, making contact with the tarp to get seeds to fall out. If the seeds are ready, the impact will cause seeds to drop. You don't need to hit the flower racemes directly, just give the plant a few good whacks on all sides. This makes the driest, largest seeds fall out, leaving the less mature smaller seeds in the plant. Although you could wrangle each seed from the nutlet, harvesting seeds in this manner selects for the highest quality.

GROWER'S GUIDE

DRYING AND THRESHING

We then pass the seeds through two different sized screens. One screen is slightly bigger than the seeds, and catches the leaves and other plant residue that may have dropped when agitated. The next screen is a little smaller than the seed, so it catches them, while letting finer chaff fall through. With kkaennip, we actually screen it an additional time. The second screen catches the largest seed which we use for planting, and the third screen catches slightly smaller seed which we use for food. Then we use a small fan to winnow out any remaining materials. The dried plants make a delicious tea that is great for the winter months.



SCREEN SIZES FOR PROCESSING SEED

(opening sizes/distance between wires, expressed in decimals of an inch):

Kkaennip:

Catches plant material: .097

Catches largest seed: .060

Catches smaller seed: .034

Smaller seeded varieties (crispa, acuta):

Catches plant material: .097

Catches seed: .034

GROWER'S GUIDE

STORING SEED

Once threshed and winnowed, the seeds should be gray or brown colored. The ideal storage for them is in an opaque envelope or clay jar in a cool dry place. It seems as though light can affect the seeds' longevity, in addition to exposure to moisture or temperature fluctuations. Perilla is notorious for decreased germination in the second year after storage. Some recommend storing leftover seed in a freezer for better results in year two.



We did some experiments and found that keeping them in sealed packages completely deprived of light resulted in nearly perfect germination even with two year old seeds. Our seeds are stored in sealed foil envelopes in a closet that remains evenly cool.

I hope that this gives you the information you need to have a long and sustained relationship with these incredible plant companions!

PERILLA AT A GLANCE

SUN:

Full to partial. Increased sunlight can affect thickness and coloring of leaves.

PLANTING DATE:

Plant after threat of frost has passed around the spring equinox during the waxing moon.

OPTIMAL GERMINATION

TEMPERATURE:

65 - 75F

PLANT SPACING:

10"-2'

MOISTURE:

Moderate. Intermittent watering recommended over deep watering with prolonged period of drying out.

DAYS TO

MATURITY:

70 days from emergence

SOURCES

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